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# Socioeconomic and demographic determinants of health insurance knowledge and coverage among street vendors in a North Indian city

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## Abstract

**Aim** This study aims to examine the association of socio-economic and demographic determinants between knowledge of health insurance and actual health insurance coverage (uptake) among the street vending community in Chandigarh, India.

**Subject and methods** A cross-sectional survey involving 250 street vendors from North-Indian city of Chandigarh was conducted between May–June 2021. Participants were selected using simple random sampling from the list of registered street vendors under the Chandigarh Municipal Corporation. Bivariate analysis and logistic regression were employed to identify the primary determinants influencing health insurance knowledge and coverage among street vendors.

**Results** The study reveals significant positive association between education level and health insurance knowledge. Adjusted odds ratios (aOR) ranged from 2.697 for street vendors with elementary education to 9.682 for those with higher educational attainment. Moreover, street vendors with relatively higher family monthly incomes exceeding INR 12000 demonstrated significantly greater knowledge of health insurance (aOR = 1.994, CI 1.007–3.949, p = 0.048). However, out of the 157 street vendors with knowledge of health insurance, only 17.19% (27) were enrolled and covered by it. Age and family size are the significant predictors of health insurance uptake, with aOR of 2.646 (CI 0.921-7.599, p = 0.071), and 0.403 (CI 0.161–1.009, p = 0.052), respectively.

**Conclusion** Education and monthly income were the significant factors influencing knowledge about health insurance among street vendors. At the same time, age and family size were significant predictors of the uptake of health insurance among street vendors. This study can help policymakers conduct periodical campaigns and prioritize strategies for speeding up the procedure of enrolling this vulnerable group under health insurance schemes.

**Keywords** Coverage · Health insurance · Informal sector · Knowledge · Socio-economic determinants · Street vendors

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## 1 Introduction

With the advancement of different medical services and a general rise in the cost, healthcare expenses have become exorbitantly high for a significant portion of the population. Public authorities and individuals are exploring various health-supporting alternatives to address challenges from escalating healthcare costs and evolving disease patterns [1]. The financial burden on households continues to increase due to rising out-of-pocket expenditure on healthcare, which leads to inflated costs of illness and impoverishment [2]. Financial burden can act as a barrier along with high cost of care and inadequate or no insurance coverage, leading to unmet healthcare needs [3]. This could be resolved to a sizable extent by opting for health insurance schemes that improve healthcare utilization and protect households against catastrophic health expenditures [4]. Health insurance is means for financing a person's health care expenses [5]. Various types of health insurance exist in India; some are Government or state-based schemes, market-based schemes (private and voluntary), employer-provided insurance schemes, or member organizations (NGO or cooperative)-based systems [1].

The World Health Organization (WHO) views health insurance as a promising avenue towards achieving universal healthcare coverage [6]. Health insurance holds the promise of enhancing and improving healthcare accessibility [7] and shielding individuals from the financial burdens associated with illness. Numerous marginalized segments of society currently face limited access to healthcare due to the looming threat of significant economic setbacks. Introducing health insurance schemes could empower them to seek healthcare without fear of financial repercussions, fostering improved healthcare utilization [8].

The informal sector, also known as the unorganized sector, constitutes a significant portion of India's labour market, with over 90% of the workforce relying on it for their livelihoods. Among the urban population engaged in this sector, approximately 14% are street vendors [9]. Street vendors have been identified as self-employed workers in the informal sector who offer their labour to sell goods and services on the street without having any permanent physical structure [10], offering various goods and services such as cobblers, vegetable and fruit vendors, food sellers, hairdressers, etc.

Despite their integral role in daily life, street vendors represent a vulnerable group within Indian society. Often constrained by financial limitations and poverty, they struggle to access quality healthcare services [11]. A significant issue for insurance coverage plans in India is the presence of roughly one-third of the population below the poverty line that has a limited capacity to pay for insurance [12, 13]. The substantial out-of-pocket expenses compel individuals to postpone or forgo necessary healthcare services [14]. A critical attempt in the direction to achieve universal health coverage was introduction of Rashtriya Swasthya Bima Yojna (RSBY) scheme by the Government of India in 2008 to provide health insurance coverage to below poverty line unorganised sector workers. This scheme was subsequently subsumed under India'a current flagship programme Pradhan Mantri Jan Arogya Yojana (PM-JAY) under the aegis of Ayushman Bharat mission [7], introduced in 2018 to holistically address the secondary, and tertiary-level health requirements of vulnerable and poor Indian population [15, 16].

Studies have indicated that only a minuscule fraction of street vendors in India have access to insurance and social protection schemes [11]. Moreover, they lack adequate knowledge about health insurance options, their potential benefits, and the necessary information to navigate available schemes [17]. It is imperative, therefore, to provide education and facilitate enrolment in government-driven national health protection schemes for such vulnerable groups. This effort would enable them to access essential healthcare facilities and social protection services, thereby safeguarding them against medical emergencies and ensuring access to crucial services such as health consultations, diagnostics, medications, and emergency support.

Considering the fact that Chandigarh, a union territory in North India, has a substantial number of street vendors registered under its Municipal Corporation [18], therefore, this study aimed to examine the socio-economic and demographic determinants of knowledge of health insurance among this vulnerable group. Subsequently, the study also explores the association between socio-economic and demographic characteristics with health insurance uptake among street vendors who know about health insurance. Since there is a need for more research on health insurance coverage among street vendors in Chandigarh and India, the insights from this study can inform policymakers to prioritize effective interventions to enhance health insurance coverage among street vendors. Additionally, it can guide public authorities and policymakers in engaging micro-insurance agents to operate at the community level, thereby promoting insurance benefits and increasing street vendors' enrolment in health insurance schemes.

## 2 Material and methods

### 2.1 Study design

It is a cross-sectional study conducted among street vendors in Chandigarh registered under the Municipal Corporation of U.T Chandigarh, India. The Municipal Corporation, Chandigarh (MCC) is the civic body that governs the entire city, which is 114 sq. km in area with 1.05 million population and 9216 street vendors registered under MCC [19]. MCC regulates the working of street vendors in the city. Street vendors have designated vending sites per the individual street vending license issued by MCC. The study was conducted between May to June 2021.

### 2.2 Sample size

The list of 9216 registered street vendors was obtained from MCC, and 250 street vendors were recruited from the list through a simple random sampling technique using random number tables [19]. The sample size (N = 250) for the present study was calculated according to a formula frequently used for calculating sample size for observational cross-sectional studies [$n = 4p(1-p)/d^2$] [20]. The prevalence of health insurance coverage among street vendors of Delhi was found to be 16.4% according to a cross-sectional study done on 300 street vendors in Delhi and Hyderabad for universal health coverage [21]. Therefore, P is 16.4%, 1−P is 83.6%, and d is 5%. Then, putting these values in the formula [20], the sample size came out to be approximately 250 (including a 10% non-response rate).

### 2.3 Data collection

The street vendors aged 18 and above and those having street vending licenses issued by MCC were included in the study. The survey was conducted using a pre-tested self-administered, semi-structured questionnaire prepared in English and local languages, i.e., Hindi and Punjabi. The questionnaire consists of multiple sections such as socio-demographic characteristics, knowledge and perception towards health insurance, and questions related to coverage/non-coverage of health insurance. The content of the questionnaire was subjected to validation by the experts. Six experts from public health and health economics backgrounds were consulted to refine and modify the questionnaire. Three rounds of discussion took place, wherein the experts participated in exhaustive discussions regarding the relevance and comprehension of the questionnaire items [22]. After incorporating the feedback from these rounds, the questionnaire was modified so as to reach a consensus on the questionnaire items [23]. Following this, a pre-testing phase was executed on 30 participants to assess the practicality and clarity of the questionnaire items [24]. Subsequently, the expert-validated questionnaire was administered to the 250 study participants (including the same 30 participants who were included in the pre-testing phase). To evaluate the test–retest reliability and consistency of the questionnaire, the Cohen's Kappa statistics was calculated (supplementary Table 1) to evaluate the agreement between the responses across two time periods for 30 participants [25]. The Kappa value for knowledge about health insurance and uptake was estimated to be 0.727 ($p < 0.01$) and 0.842 ($p < 0.01$), indicating significant substantial agreement and strong agreement, respectively [23]. This substantiated the test–retest reliability regarding questions concerning knowledge and uptake of health insurance.

### 2.4 Study variables

#### 2.4.1 Independent variables

*Age* variable was categorized into two groups: 18 to 35 years, 36 years, and above. *Gender* was categorized as a binary variable (male and female). *Marital status* was grouped into two categories: married at least once (including widowed and divorced) and unmarried. *Highest Education* was grouped into four categories: uneducated, elementary, secondary and senior secondary, and above class 12th. *Family size* was treated as a binary variable and grouped as up to four and above four family members. *Family monthly* income was categorized into two categories up to Indian National Rupee (INR) 12,000 and above 12,000. This was done by considering different state-wise criteria for identifying people living below the poverty line. In some states, families with a monthly income of INR 11,850 [26] are regarded as 'poor families.' Therefore, a crude estimate of INR 12,000 was used as a cut-off point to divide the income into two categories.

#### 2.4.2 Dependent variable

*Knowledge about health insurance* was categorized as a dependent binary variable (Yes, No), to examine the association between socio-economic and demographic determinants and knowledge of health insurance among street vendors. The term 'knowledge' of health insurance in the context of the present study means the basic minimal information about the concept and existence of health insurance in India. Further, the *Uptake of Heath Insurance* was treated as another dependent binary variable (Yes, No) to explore the association between socio-economic and demographic characteristics with the uptake of health insurance among street vendors having knowledge about health insurance.

### 2.5 Statistical analysis

This study aimed to find an association between socio-economic and demographic characteristics with knowledge about health insurance and its uptake among the street vending community. Therefore, the statistical analysis was undertaken in two steps. In the first step, the bivariate associational analysis was applied to examine the association between knowledge about health insurance and their socio-economic and demographic determinants. Thereafter, multivariable logistic regression analysis was performed to examine the association between the socio-economic and demographic characteristics with health insurance knowledge among study participants [27]. Further, in the second step, multivariable logistic regression was performed among people who actually enrolled for health insurance (uptake) to assess the association of the socio-economic and demographic characteristics with the uptake of health insurance among study participants. Data was entered in Microsoft Office Excel, 2021 and analyzed using IBM SPSS version 25 software, taking $p \leq 0.05$ as statistically significant and $p \leq 0.10$ as marginally significant [28]. Figure 1 depicts the detailed study design and methodology of the study.

## 3 Results

The study sample of 250 participants captured a reasonably diverse demographic and socio-economic profile (supplementary Table 2). Most respondents were middle-aged, with 73.2% aged 36 years or above, and predominantly male (91.2%). Most were married (90.4%), lived in smaller families of up to 4 members (54.8%), and were earning Rs. (INR)

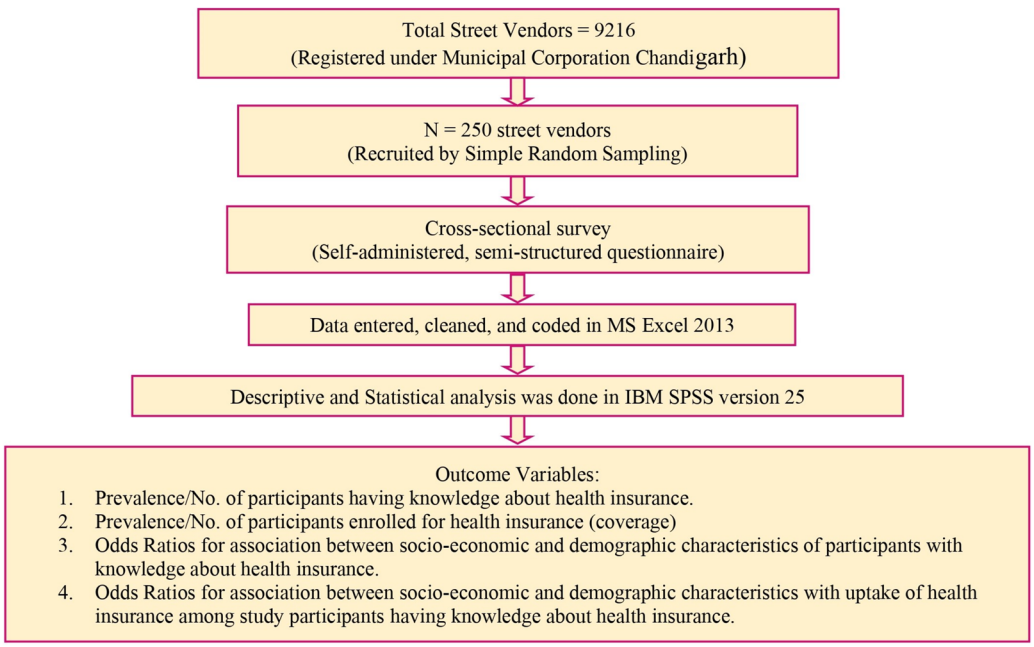


**Fig. 1** Flow chart showing the study design and methodology

12,000 or less per month (76.4%). Education levels spanned from no formal education (13.6%) to above 12th grade (8.8%), although the majority participants had attended secondary and senior secondary schooling (44%) (Supplementary Table 2).

Table 1 also presents the results of a bivariate associational analysis examining the relationship between knowledge about health insurance and various socio-economic and demographic characteristics among 250 study participants. Approximately 63% of participants possessed knowledge about health insurance. There was no significant association of knowledge with age, gender, marital status, or family size. However, a significant association with education level was found ($p \leq 0.05$). Of the uneducated participants, approximately 41.2% possessed knowledge of health insurance, whereas out of those who had completed 12th grade and above, a majority (81.8%) were having knowledge of health insurance. Monthly family income also showed a significant association ($p \leq 0.05$), with 59.2% of respondents who had a monthly family income up to Rs. (INR) 12,000 being knowledgeable, whereas 74.6% of respondents with a monthly family income of Rs. (INR) 12,000 and above knew about health insurance.

Table 2 presents the outcomes of a multivariable logistic regression analysis investigating the relationship between socio-demographic factors and individuals' knowledge regarding health insurance. The Nagelkerke R-squared statistic, with a value of 11.2%, indicates the extent to which the model accounts for the variability observed in health insurance knowledge. The model exhibits an overall predictive accuracy of 67.2% (which is above its prescribed threshold of 50%) [27], denoting its ability to anticipate probabilities correctly [27]. Notably, compared to the uneducated group, all education categories exhibit statistical significance ($p < 0.05$). The odds of having health insurance knowledge increased with an increase in the education level of vendors, having adjusted odds ratios of 2.697, 3.452, and 9.682 for Elementary, Secondary and senior secondary, and above 12th class, respectively.

Additionally, participants with family monthly incomes exceeding INR 12,000, as opposed to those with incomes at or below this threshold, demonstrated significantly heightened odds of possessing knowledge about health insurance, with an adjusted odds ratio of 1.994 and confidence interval ranging from 1.007 to 3.949 ($p = 0.048$).

Figure 2 shows the socio-demographic characteristics of enrolled street vendors (n = 27) for health insurance. The present study recorded that only 17.19% (n = 27) of street vendors having knowledge of health insurance (n = 157) actually enrolled for it and were covered by health insurance. Of these 27 street vendors, one-third (33.33%) of the street

**Table 1** Bivariate associational analysis between knowledge about health insurance and socio-economic and demographic characteristics of study participants (N = 250)

| Characteristics | Knowledge about health insurance | | p-value | Chi-square value |
|---|---|---|---|---|
| | No n = 93 (37.2%) | Yes n = 157 (62.8%) | | |
| **Age (in years)** | | | | |
| 18–35 | 27 (40.3%) | 40 (59.7%) | 0.540 | 0.376 |
| 36 and above | 66 (36.1%) | 117 (63.9%) | | |
| **Gender** | | | | |
| Male | 86 (37.7%) | 142 (62.3%) | 0.584 | 0.299 |
| Female | 7 (31.8%) | 15 (68.2%) | | |
| **Highest education** | | | | |
| Uneducated | 20 (58.8%) | 14 (41.2%) | 0.010** | 11.310 |
| Elementary | 33(39.3%) | 51 (60.7%) | | |
| Secondary and senior secondary | 36 (32.7%) | 74 (67.3%) | | |
| Above 12th class | 4 (18.2%) | 18 (81.8%) | | |
| **Marital status** | | | | |
| Married (at least once) | 82 (36.3%) | 144 (63.7%) | 0.357 | 0.847 |
| Unmarried | 11 (45.8%) | 13 (54.2%) | | |
| **Family size** | | | | |
| Up to 4 | 46 (33.6%) | 91 (66.4%) | 0.192 | 1.703 |
| 4 and above | 47 (41.6%) | 66 (58.4%) | | |
| **Family income (INR/month)** | | | | |
| Up to 12,000 | 78 (40.8%) | 113 (59.2%) | 0.032** | 4.584 |
| 12,000 and above | 15 (25.4%) | 44 (74.6%) | | |

** $p \leq 0.05$, statistically significant

**Table 2** Multivariable logistic regression analysis of the socio-economic and demographic characteristics with health insurance knowledge among study participants (N = 250)

| Variables | Knowledge about health insurance | | | |
|---|---|---|---|---|
| | Unadjusted OR (Confidence interval) | p-value (Unadjusted) | Adjusted OR[a] (Confidence interval) | p-value (adjusted) |
| **Age (in years)** | | | | |
| 18–35 | Ref. | | Ref. | |
| 36 and above | 1.197 (0.674–2.124) | 0.540 | 1.451 (0.751–2.801) | 0.268 |
| **Gender** | | | | |
| Male | Ref. | | Ref. | |
| Female | 1.298 (0.509–3.310) | 0.585 | 1.775 (0.632–4.988) | 0.276 |
| **Highest education** | | | | |
| Uneducated | Ref | | Ref. | |
| Elementary | 2.208 (0.981–4.969) | 0.056* | 2.697 (1.133–6.421) | 0.025** |
| Secondary and senior secondary | 2.937 (1.332–6.474) | 0.008** | 3.452 (1.449–8.223) | 0.005** |
| Above 12th class | 6.429 (1.786 – 23.138) | 0.004** | 9.682 (2.393–39.166) | 0.001** |
| **Marital status** | | | | |
| Married (at least once) | Ref. | | Ref. | |
| Unmarried | 0.673 (0.288–1571) | 0.360 | 0.578 (0.218–1.535) | 0.271 |
| **Family size** | | | | |
| Up to 4 | Ref. | | Ref. | |
| 4 and above | 0.710 (0.424–1.189) | 0.193 | 0.747 (0.431–1.296) | 0.299 |
| **Family income (INR/month)** | | | | |
| Up to 12,000 | Ref. | | Ref. | |
| 12,000 and above | 2.025 (1.054–3.891) | 0.034** | 1.994 (1.007–3.949) | 0.048** |

** $p \leq 0.05$, statistically significant, * $p \leq 0.10$, marginally significant

Goodness of fit statistics

[a] Adjusted Odds Ratios (aOR) and the corresponding 95% confidence intervals

The predicted probabilities are for those who had knowledge about health insurance

The Nagalkerke $R^2$ value = 0.112 and Predictive accuracy = 67.2% (>50% cut off value)

vendors were in the age group of 18 to 35 years. Around 88.89% of street vendors were men. Around 11.11% of street vendors were uneducated, 48.15% had elementary education, 33.33% had secondary and senior secondary education, and 7.41% were educated above 12th class. Around 92.59% of street vendors were married (at least once). Around 59.26% of street vendors had four or more family members and a monthly income above INR 12000.

Table 3 presents the findings of a multivariable logistic regression analysis that explores the relationship between socio-economic and demographic characteristics and the uptake of health insurance among study participants who possess knowledge about health insurance. The Nagelkerke R-squared statistic, with an associated value of approximately 11%, signifies the extent to which the model explains the variance observed in the uptake of health insurance among street vendors possessing the knowledge of health insurance. Notably, the model demonstrates an impressive overall predictive accuracy of 82.2%, (more than the prescribed threshold of 50%) [27] indicating its proficiency in correctly forecasting probabilities. Compared to the younger age group (18–35 years), participants aged 36 years and above had 2.646 times higher adjusted odds (CI 0.921–7.599; p = 0.071) of having health insurance coverage, indicative of a marginally significant positive association between health insurance coverage and older age. Additionally, participants with relatively bigger family sizes of four people and above, as opposed to those with family sizes below four, demonstrated significantly lower odds (59.7% lower odds) of possessing health insurance, with an adjusted odds ratio of 0.403 and a confidence interval ranging from 0.161 to 1.009 (p = 0.052).

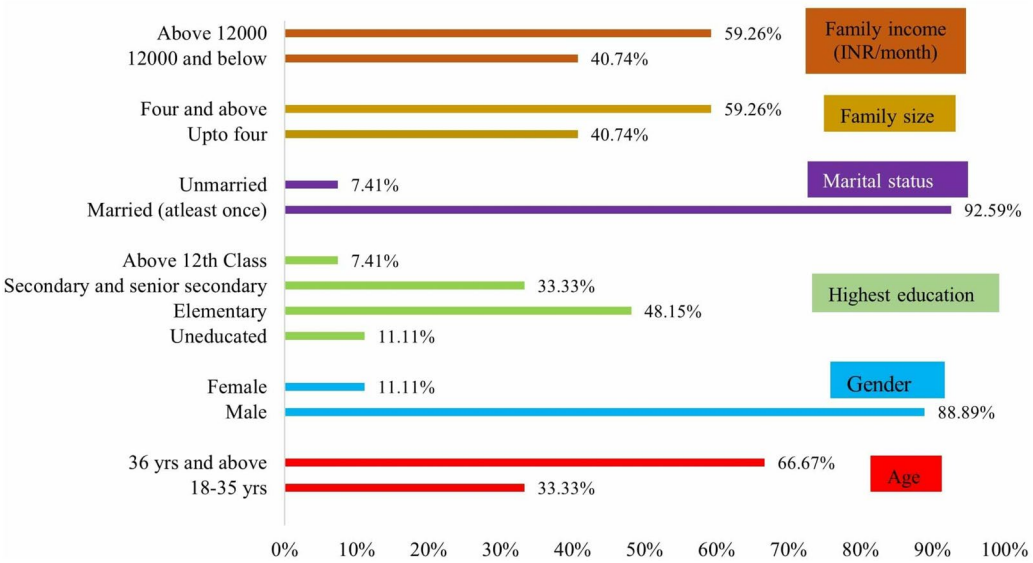


**Fig. 2** Socio-demographic characteristics of participants enrolled for health insurance (n = 27)

**Table 3** Multivariable logistic regression analysis of the socio-economic and demographic characteristics with uptake of health insurance among study participants having knowledge about health insurance (N = 157)

| Variables | Uptake of health insurance | | | |
|---|---|---|---|---|
| | Unadjusted odds ratios (Confidence interval) | p-value (Unadjusted) | Adjusted odds ratios[a] (Confidence interval) | p-value (Adjusted) |
| **Age (in years)** | | | | |
| 18–35 | Ref. | | Ref. | |
| 36 and above | 1.597 (0.652–3.912) | 0.306 | 2.646 (0.921–7.599) | 0.071* |
| **Gender** | | | | |
| Male | Ref. | | Ref. | |
| Female | 0.814 (0.213–3.104) | 0.763 | 0.656 (0.152–2.839) | 0.573 |
| **Highest education** | | | | |
| Uneducated | Ref. | | Ref. | |
| Elementary | 0.797 (0.192–3.310) | 0.755 | 0.749 (0.159–3.515) | 0.714 |
| Secondary and senior secondary | 1.970 (0.460–8.435) | 0.361 | 1.968 (0.402–9.630) | 0.159 |
| Above 12th Class | 2.182 (0.311–15.288) | 0.432 | 2.716 (0.306–24.134) | 0.370 |
| **Marital status** | | | | |
| Married (at least once) | Ref. | | Ref. | |
| Unmarried | 1.155 (0.241–5.538) | 0.857 | 1.145 (0.181–7.247) | 0.886 |
| **Family size** | | | | |
| Up to 4 | Ref. | | Ref. | |
| 4 and above | 0.430 (0.185–1.000) | 0.050** | 0.403 (0.161–1.009) | 0.052* |
| **Family income (INR/month)** | | | | |
| Up to 12,000 | Ref. | | Ref. | |
| 12,000 and above | 0.910 (0.366–2.262) | 0.838 | 1.035 (0.382–2.801) | 0.946 |

** $p \leq 0.05$, statistically significant

* $p \leq 0.10$, marginally significant

Goodness of fit statistics

[a]Adjusted Odds Ratios (aOR) and the corresponding 95% confidence intervals

The predicted probabilities are for those who had enrolled for health insurance (uptake)

The Nagalkerke $R^2$ value = 0.11 and Predictive accuracy = 82.2% (> 50% cut off value)

## 4 Discussion

Our study found that a sizable number of street vendors had knowledge of health insurance. However, only a few of them enrolled for health insurance services. This reflects that the uptake of health insurance is less among this vulnerable group despite knowing the concept and existence of health insurance schemes in general. This was also evident in a related study conducted in Delhi and Hyderabad in 2018, which reported that most street vendors knew about health insurance. Still, only a few were covered under health insurance [21]. The low coverage can be attributed to many possible reasons [1]. These could be due to lack of education, awareness, ignorance, relatively low socio-economic status of the street vendors, and lack of promotional efforts by the insurance companies.

It has been found that street vendors with certain socio-demographic variables were more conducive to enrolling in health insurance. Out of the 27 street vendors who already enrolled for health insurance, one-third were 18 to 35 years old, the majority were males, were married, and many were educated with relatively higher monthly family income. A similar study in Kenya reported that secondary education, being married, being middle-aged, and having a higher income are the main drivers for more health insurance coverage [29]. Another study stated that an educated person can be expected to have a higher income and report a positive association between these variables and enrolment [30]. Our study's findings are consistent with those mentioned above.

Results of multivariable logistic regression of the socio-economic and demographic characteristics with health insurance knowledge among study participants observed that income and education significantly affect the knowledge and perception of health insurance among street vendors. Higher-income is positively associated with more health insurance awareness and coverage [31]. The respondents in the study had relatively higher family incomes and recorded greater odds of knowledge of health insurance. This may be due to the fact that with higher income, there is an increased ability to attain education, ultimately enhancing knowledge and perception. A previous study observed that high income is a predictor of opting for health insurance [32]. A study in the United States, observed that individuals with income below the federal poverty level are more likely to have inadequate knowledge of health insurance terms and confidence in using health insurance compared to those with higher income levels [33]. Similarly, the participants who were educated up to elementary, secondary, and senior secondary or above recorded significantly higher odds of knowledge about health insurance. Our findings are consistent with the findings of a study conducted in the Sub-Saharan African population, which described the increased impact of secondary or higher educational attainment on coverage of health insurance [34]. Another study conducted at the sub-national level in India also implicated education as a significant factor in awareness about health insurance [21]. Thus, education can be associated with increased awareness about health insurance [35]. A study related to health insurance observed that education enhanced the likelihood of being insured for health insurance [36]. Hence, the present study findings align with the existing literature.

Results of multivariate logistic regression among study participants who had knowledge about health insurance reflected that age and family size are significant in the uptake of health insurance. The respondents in the study in higher age groups recorded greater odds of uptake of health insurance. This could be because the risk of health issues increases with age or an increase in multimorbidity with age, which can lead to a decline in overall health. A systematic review conducted also stated that the prevalence of multimorbidity increases with an increase in age [37]. Further, the study respondents with higher family size recorded lower odds of uptake of health insurance. This can be attributed to the fact that with higher family sizes, people are not able to meet their needs because of limited financial resources. A previous study conducted in Cambodia observed that household size was a possible obstacle to enrollment in community-based health insurance, with study respondents from large households describing the financial burden of insuring all household members [38]. Hence, the present study findings align with the existing literature.

The theory of planned behaviour is frequently used to examine how people behave through their actions [39]. It focuses on both motivation and individual's ability to undergo the desired behavioural change. Further, 'the health belief model' highlights the perceived usefulness and perceived risk as the main factors that may impact the attitude toward acquiring health insurance in antecedent-outcome connections. Both these theories explain that the participants of higher age groups recorded greater odds of uptake of health insurance owing to perceived higher health risk with increasing age and therefore motivating them to enrol for health insurance. Additionally, 'the ability to pay approach' [40] explains the limited amount of non-subsistence spending available for people with high family size as in the case of present study, thereby limiting their ability to enrol for health insurance uptake.

Nevertheless, the study has its limitations. A study conducted in urban areas of Chennai observed that a sizable number of street vendors were covered under health insurance [41], which is in contrast with the present study. The

difference may be due to the limited sample size and method adopted in the present study. The present study followed a cross-sectional design; hence, socio-economic and demographic predictors of knowledge about health insurance only point out associational relationships and do not reflect causality between them. The present study also could not find an association between gender and knowledge about health insurance due to the predominance of male respondents in the study. Thus, there exists a significant gender imbalance, which can be attributed to the male-dominated street vending community in the Indian context. However, the study has used the multivariable logistic regression, wherein the gender imbalances have been adjusted while reporting the effect of other socio-economic and demographic variables on health insurance knowledge and uptake. The results are robust and in line with the goodness of fit standards for logistic regression analysis. In addition to this, the self-reported nature of the data may further lead to the recall and social desirability biases, further limiting the generalizability of the results.

The present study has its strengths as well. It is pertinent to mention that the concept of knowledge about health insurance among vulnerable groups like street vendors has not been researched much in the Indian context. Further, the study has provided crucial information on the association of socio-economic and demographic characteristics of street vendors of Chandigarh with the knowledge and uptake of health insurance, and it will serve as a base for conducting similar temporal studies to gather more evidence to identify the gaps in coverage of health insurance among street vendors.

Our study accounts for major socio-economic factors and points to some important conclusions. We find inequities in awareness and participation in health insurance by income and educational attainment groups. Increased knowledge about health insurance and its benefits will lead to increased health insurance coverage by the street vendors in Chandigarh. Increased Health insurance coverage significantly reduces the burden of catastrophic healthcare expenditure and protects people from possible impoverishment. Therefore, the focus should be spreading awareness and encouraging participation among street vendors to promote various health insurance schemes, especially the enrolment under PM-JAY scheme. Additionally, a yearly evaluation of health insurance coverage should be conducted, with relevant actions taken to address the gaps and increase the participation of vulnerable groups in society. To further enhance coverage especially for those unorganized sector workers who are marginally above the poverty line and therefore cannot be enrolled under PM-JAY, the policymakers could introduce subsidized health insurance plans specifically designed for such vulnerable groups, ensuring affordability without compromising on health benefits.

In light of the above backdrop, it is imperative for all these vulnerable social group workers to enrol themselves in health insurance [29]. They must be aware of health insurance's benefits instead of taking it as a mere requirement. The country needs to recognize street vendors' economic and social benefits to the economy, which could prioritize the inculcation and strengthening of public policies for these informal workers [42].

## 5 Conclusion

Higher educational level and monthly income were the significant factors influencing knowledge about health insurance among street vendors. Since health insurance coverage provides financial risk protection significantly to economically and socially vulnerable groups like street vendors, this study's findings can help policymakers prioritize strategies for effective interventions to increase health insurance coverage among street vendors. To enhance coverage of vulnerable sections, the policymakers should introduce the subsidized or tiered premium structures tailored to low-income groups, ensuring that cost is not a prohibitive factor. The PM-JAY is a vital model in this context, offering free health coverage to economically disadvantaged sections. However, further efforts are needed to ensure that the unorganized work force particularly those in remote areas, are effectively enrolled and can access the benefits. Furthermore, it is pertinent to conduct periodical campaigns and speed up the procedure of enrolling unorganized workforce, especially the vulnerable poor and elderly population, under ambit of health insurance schemes. Additionally, they can engage micro-insurance agents who can work at the community level to educate and create awareness about the insurance benefits, which, consequently, can go a long way in increasing the uptake of health insurance schemes by the street vending community.

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visualization; Saraswati Sharma (SS)—Data curation and data visualization; Himika Kaundal (HK)—Data collection and Data curation; Poonam Khanna (PK)—Conceptualization, Data collection and Supervision; Amarjeet Singh (AS)—Conceptualization, Methodology and overall supervision; Tanvi Kiran (TK)—Methodology, analysis, review and editing, overall supervision.Disclosures All authors had full access to the articles reviewed in this manuscript, have read and reviewed the final draft of this manuscript, and take complete responsibility for the integrity and accuracy of this manuscript. The content published herein solely represents the views and opinions of the authors.

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**Data availability** The datasets generated during and/or analyzed during the current study will be made available by the corresponding author on reasonable request. Further, the said dataset has been already shared with the journal.

## Declarations

**Ethics approval and consent to participate** The study was approved by the Institutional Ethics Committee (IEC) of the PGIMER, Chandigarh, vide letter no. INT/IEC/2021/SPL-677. A written informed consent form was obtained from all the participants before conducting the survey. Steps were taken to ensure confidentiality and privacy of the participants; only de-identified data was used. All methods were carried out in accordance with relevant guidelines and regulations in the manuscript. Participants were required to read and provide their consent, before starting data collection.

**Competing interests** The authors declare no competing interests.



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